

REMARKS

Claims 1-11, 17, 18, and 20-35 are pending, with claims 1-4 being independent. Claims 1-4 have been amended. No new matter has been introduced.

Claims 1, 3, 10, 20, 22, 24, 26, 32, and 34 have been rejected as being unpatentable over U.S. Patent No. 4,646,424 (Parks) in view of U.S. Patent No. 6,009,888 (Ye). Applicant requests withdrawal of this rejection because neither Parks, Ye, nor any proper combination of the two describes or suggests removing a resist pattern by using a resist stripper which dissolves and removes the resist pattern after irradiating the resist pattern, as recited in claims 1 and 3, and because one of ordinary skill in the art would not have been motivated to modify Parks in the manner set forth in the rejection.

In Parks, after a wafer is cleaned and coated with a layer of titanium, the wafer is plasma etched to remove titanium present beneath an exposed resist pattern. See Parks at col. 6, lines 3-39. Next, the substrate is "plasma ashed in an oxygen atmosphere to remove the remaining photoresist material." See Parks at col. 6, lines 39-59. Thus, the photoresist material in Parks is removed by an ashing method. There is nothing in Parks that would suggest that such photoresist material is removed using a "resist stripper which dissolves and removes the resist pattern," as recited in claims 1 and 3.

The Examiner points to col. 6, lines 58-59 of Parks to somehow show such a resist stripper. However, this passage in Parks merely explains that the remaining resist material is stripped from the substrate (presumably using the ashing method detailed in other sections of Parks) and Parks does not indicate that the resist material is removed using a resist stripper. Indeed, as Parks explains in the passages at col. 3, lines 5-8 and col. 6, lines 44-48, the remaining resist material is removed using a plasma ashing method.

Furthermore, Parks never describes or suggests that the photoresist material would be removed after a resist pattern is irradiated, as also recited in claims 1 and 3. Rather, Parks performs the removal of the photoresist after the wafer is plasma etched. See Parks at col. 6, lines 3-59.

Moreover, Ye does not remedy the failure of Parks to describe or suggest this subject matter. In Ye, the photoresist pattern 28 is not removed using a resist stripper. Rather, in Ye, the photoresist pattern 28 is removed with a combination of a UV laser 111 and an acid bath. See Ye at col. 6, lines 32-34 and line 62 to col. 7, line 3. Additionally, Ye's removal of the photoresist pattern 28 is not performed after irradiation of Ye's photoresist pattern 28. Rather, the removal of Ye's photoresist pattern 28 is performed concurrently with or prior to irradiation of Ye's photoresist pattern 28. As Ye explains, "the photoresist pattern 28 and polymer layer 30 are immersed in a wet bath 34 ... and then the wafer, polymer and photoresist are irradiated 36 with UV light, preferably from a UV laser." See Ye at col. 5, lines 43-49 and Fig. 3.

Thus, even if one were to modify Parks with Ye's removal method, Parks would still fail to describe or suggest removal of a resist pattern using a resist stripper after irradiating the resist pattern.

Additionally, there is nothing in the cited art that would have motivated one of skill in the art to modify Parks to provide for such irradiation or to provide for removal of a resist pattern using a resist stripper after irradiating such resist pattern. Any such modification of Parks would change the principle of operation of Parks, which merely uses plasma ashing to remove a resist and never suggests irradiating the resist prior to removal of the resist. See Parks at col. 2, line 58 to col. 3, line 8.

The Examiner points to col. 4, lines 33 and 34 and col. 6, lines 25 and 26 of Ye to somehow provide such motivation. These passages explain that the wet bath/UV laser photoresist removal effect is "superior to conventional photoresist strip processes at removing polymers over photoresist layers." However, Parks' method would not obtain such a benefit since Parks provides no indication that polymers over the resist layer are to be removed.

For at least these reasons, claims 1 and 3 are allowable over any proper combination of Parks and Ye. Claims 10, 20, 22, 24, 26, 32, and 34 are allowable for at least the reasons that claims 1 and 3 are allowable.

Claims 2, 4, 9, 11, 21, 23, 25, 27, 33, and 35 have been rejected as being unpatentable over Parks in view of Ye. Applicant requests withdrawal of this rejection neither Parks, Ye, nor any proper combination of the two describes or suggests removing a residue of a resist pattern by using a developer after irradiating the residue of the resist pattern, as recited in claims 2 and 4,

and because one of ordinary skill in the art would not have been motivated to modify Parks in the manner set forth in the rejection.

There is nothing in Parks that would suggest that the photoresist material is removed using a "developer," as recited in claims 2 and 4. Rather, as discussed above, Parks explains that the photoresist material is removed using a plasma ashing method in an oxygen atmosphere. See Parks at col. 6, lines 44-47. Additionally, Parks never describes or suggests that the photoresist material would be removed after a resist pattern is irradiated, as also recited in claims 2 and 4 since Parks does not describe irradiation of a residue of a resist pattern with a light.

Moreover, while Ye mentions that a UV laser in combination with an acid bath is used to remove the photoresist pattern 28, Ye fails to describe or suggest that the photoresist pattern and the residue of the resist pattern are removed using a developer after the UV laser irradiates a residue of the photoresist pattern 28.

For at least these reasons, claims 2 and 4 are allowable over Parks and Ye. Claims 9, 11, 21, 23, 25, 27, 33, and 35 depend from claims 2 and 4 and are allowable for at least the reasons that claims 2 and 4 are allowable.

Claims 5-8 have been rejected as being unpatentable over Parks in view of Ye and U.S. Patent No. 6,645,851 (Ho). Claims 5-8 depend, respectively, from claims 1-4, which were rejected as being unpatentable over Parks in view of Ye. Ho does not remedy the failure of Parks and Ye to describe or suggest the subject matter of claims 1-4. In Ho, a photoresist layer 14 is "blanket exposed without a patterned mask and is then developed in an aqueous base solution to remove all photoresist 14 above dielectric layer 12." However, Ho never describes or suggests irradiating a resist pattern, as recited in claims 1 and 3, or irradiating a residue of a resist pattern, as recited in claims 2 and 4, and therefore, Ho also never describes removal of such resist pattern after irradiating. For at least these reasons, claims 1-4, and dependent claims 5-8, are allowable over any proper combination of Parks, Ye, and Ho.

Claims 17 and 18 have been rejected as being unpatentable over Parks in view of Ye and U.S. Patent No. 4,816,115 (Hörner). Claims 17 and 18 depend, respectively, from claims 3 and 4, which were rejected as being unpatentable over Parks in view of Ye. Hörner does not remedy the failure of Parks and Ye to describe or suggest the subject matter of claims 3 and 4. In Hörner, while a photoresist layer 9 is exposed with radiation, as described at col. 7, lines 30-52,

there is no description of irradiation of a resist pattern, as recited in claim 3, or irradiation of a residue of a resist pattern, as recited in claim 4. Therefore, there is no description of removal of such a resist pattern or residue after such irradiation. For at least these reasons, claims 3 and 4, and dependent claims 17 and 18, are allowable over any proper combination of Parks, Ye, and Hörner.

Claims 28-31 have been rejected as being unpatentable over Parks in view of Ye and U.S. Patent No. 4,673,808 (Katohno). Claims 28-31 depend from claims 1-4, which were rejected as being unpatentable over Parks in view of Ye. Katohno does not remedy the failure of Parks and Ye to describe or suggest the subject matter of claims 1-4. In Katohno, while a resist is stripped, there is no suggestion that the resist or a residue of such resist is stripped after irradiating a resist pattern (or residue of resist pattern). See Katohno at col. 5, lines 4-30. Accordingly, claims 1-4 and dependent claims 28-31 are allowable over any proper combination of Parks, Ye, and Katohno.

In conclusion, applicant submits that the claims are in condition for allowance. No fees are believed due. Please apply any charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: July 5, 2007

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